

### Abstract of the Disclosure

Robot arm end effectors rapidly transfer semiconductor wafers between a wafer cassette and a processing station. Preferred embodiments of the end effectors include proximal and distal rest pads, the latter having pad and backstop portions that support and grip the wafer at its peripheral edge or within an annular exclusion zone that extends inward from the peripheral edge of the wafer. Preferred embodiments of the end effectors also include fiber optic light transmission sensors for determining various wafer surface, edge, thickness, tilt, and location parameters. The sensors provide robot arm extension and elevation positioning data supporting methods of rapidly and accurately placing and retrieving a wafer from among a stack of closely spaced wafers stored in the wafer cassette.